

REMARKS

The Examiner indicates that Restriction is required under 35 USC 121 and 372. The Examiner believes the claims are divided into two groups as follows: Group 1, Claims 1-17, and 20-26 drawn to electrodes for photovoltaic elements and Group 2, Claims 18 and 19 drawn to cells or modules having an electrode according to Claim 1.

The Examiner divided the claims into the above two groups alleging that they do not relate to a single concept because the electrode claimed in Claim 1 is obvious from the prior art. In particular, the Examiner refers to Little (presumably US 4,380,112) and alleges that Little discloses electrodes seen in Figures 9 and 11 and referred to in Column 7, Lines 40-55 according to Claims 1-3, except for the low melting alloy. The Examiner then alleges that the use of the low melting alloy cannot be considered a special technical feature since the use of such alloys as solder for connecting electrodes (e.g., Pb/Sn solders) is entirely conventional in the art and it would have been obvious to use such solder to ensure solid contact between the electrode and wires and bus bars of Little. The Examiner also refers to Page 2, Lines 28-33 of EP 0 807 980 A2.

In case the Examiner does not have ready access, Applicant encloses a copy of a response to a written opinion in which the claimed invention was alleged to be obvious. The response traverses the written opinion and provides a concise explanation of why Applicant's invention is not obvious in view of the same references as mentioned by the Examiner in this case.

In short, Little discloses a plate in which wires are embedded by heating the plate up to a temperature of 700 degrees Celcius, whereas Applicant's claim 1 recites a film having an adhesive layer on a surface thereof and a first plurality of electrically conductive wires embedded into the adhesive layer such that a part of the surfaces of the wires protrudes from the adhesive layer. The part that protrudes is covered with a

coating comprising a low melting point alloy.

Little provides no motivation to use anything other than a plate and thus provides no motivation to replace the plate with the film recited in Applicant's claim 1.

In Applicant's claim 1, the wires are embedded into the adhesive layer on the film, not into the film itself. This avoids the need to heat a plate to temperatures of 700 degrees Celsius to soften the plate to enable the wires to be pressed into it. Rather in applicant's claimed invention, the wires are simply embedded in the adhesive without the high temperature requirement to soften the surface and without the requirement to press the wires to embed them in the softened surface.

Furthermore, it should be appreciated that the adhesive layer is used to secure the film to the surface of a photovoltaic element. Little does not disclose or suggest the use of adhesive, but rather employs a process of electrostatic bonding, which is entirely different from adhesively securing and which requires the wires to be embedded in the surface of the plate. Embedding of the wires in an adhesive on the plate rather than in the plate would not permit electrostatic bonding to occur. Electrostatic bonding is a much more complex process than simply using an adhesive.

The adhesive layer 11 recited in Applicant's Claim 1 not only holds the conductive wires 5' but also keeps wires 5' adhesively attached (force fit) to the to the optically transparent film 10 and provides for attachment of the wires to the front side of the solar cell.

It is also evident that according to Little's patent electric contact between naked (without any alloy) copper wires and the solar cell occurs by means of mechanical pressure between the solar cell and the glass plate due to an electrostatic bond. At the same time mechanical pressure cannot provide electrical contact of the same high quality as a soldered contact. The claimed invention involves the use of metallic, (e.g., copper) wires that are coated with a low melting point alloy. Under an impact of 2.0-15

psi pressure and modest temperature of 130-150C the alloy melts, wets the solar cell surface, and solders the wires onto the solar cell surface to establish a reliable and low resistance ohmic contact between the wires and the solar cell front side.

The electrode can provide a low resistance ohmic between the coated wires and the front side of the solar cell but alternatively can be used to provide a low resistance ohmic contact between the coated wires and a metallic surface, such as the aluminium layer on the rear side of solar cell. It is not practical to provide direct mechanical contact between copper wire and an aluminium layer without special treatment of the aluminium such as by providing an additional coating comprised of chromium, nickel and silver or copper. The claimed electrode eliminates the need for such special treatment. Thus the electrode can be used in more than one application on a solar cell.

Furthermore the electrode of present invention not only facilitates harvesting of electric power from a photovoltaic solar cell but also interconnection of several photovoltaic solar cells thereby eliminating stringing technology, to connect adjacent solar cells together. The Little device cannot be used to connect adjacent solar cells together.

From the foregoing, it should be appreciated that Little fails to disclose or suggest various aspects of applicant's claimed invention.

While EP 0 807 980 A2 may disclose the use of solder, it does not disclose the solder as a layer or cladding on the wires to be attached to a terminal bar. Furthermore, the use of solder in the method disclosed by Little, would be of no purpose and could interfere with the electrostatic bonding of the plate and embedded wires to the surface of the bare exposed junction side surface of the semiconductor wafer.

The EP 980 patent effectively teaches away from the present invention when an expert looks for a possibility to keep the temperatures required during production and the transition resistance between wafer and electrode as low as possible.

Therefore, there is no motivation to combine the teachings of the references and even if they were combined, the resulting device would be deficient in many aspects of applicant's claims as set forth above and would likely not work or would be inferior. Therefore, applicant respectfully submits that neither Little nor EP 0 807 980 A2 taken alone or in combination renders the applicant's claimed invention obvious. Applicant's invention is not obvious.

The restriction requirement set forth by the Examiner is therefore traversed, on at least the basis that Claim 1 is not obvious and that as such Claim 1 links all of the claims into a single group.

Moreover, If the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions. MPEP §803. In this case, since, as discussed above, Claim 1 links all of the claims into a single group, a single field of search will cover all of the claims. Because all of the claims can be covered in a single search, the Applicant's representative respectfully submits that there is no serious burden on the Examiner. Therefore, the Applicant respectfully requests withdrawal of the Restriction Requirement.

In the event that the Examiner is not persuaded by the above arguments, Applicant hereby elects examination to proceed with the claims of Group 1 namely Claims 1-17 and 20-26.

The Examiner also alleges this application contains claims directed to more than one species of the generic invention. The Examiner alleges these species are deemed to lack unity of invention because they are not so linked as to perform a single and general inventive concept under PCT Rule 13.1. If the Examiner is persuaded by the arguments above i.e., that Claim 1 is linking, then the Examiner is requested to review all of the claims. In the event that the Examiner is not persuaded by the above

arguments, then Applicant respectfully requests the Examiner focus on the claims of Group A, namely claims 4, 5, and 8.

If the Examiner is not persuaded by the above arguments and still believes the claimed invention is obvious, Applicant invites the Examiner to contact Applicant's representative John W. Knox, Reg. No. 35,776 at (604) 682-7780 for a telephone interview with the inventor.

Respectfully submitted,

BLACK LOWE & GRAHAM^{PLLC}

A handwritten signature in black ink, appearing to read 'P.G. Scott Born', written over the firm name.

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